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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|---------------------------------|----------------------------|------------------|
| 10/530,449 | 04/06/2005 | Martijn Henri Richard Lankhorst | NL02 0983 US | 6730 |
| 65913 NXP, B.V. NXP INTELLECTUAL PROPERTY DEPARTMENT M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131 | | | EXAMINER INGHAM, JOHN C | |
| | | | ART UNIT 2814 | PAPER NUMBER |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | MAIL DATE | DELIVERY MODE | |
| 3 MONTHS | | 02/02/2007 | PAPER | |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/530,449

Applicant(s)

LANKHORST ET AL.

Examiner

John C. Ingham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. The amendments to the claims filed 22 November 2006 have been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims **1-4 and 8-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang (US 6,339,544) and Yan (US 2002/0134995).

5. Regarding claims **1-4**, Chiang discloses in Fig 13 an electric device with a body having: a resistor (290) comprising a phase change material (abstract) which is able to be in a first phase and in a second phase, the resistor having a surface with a first

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contact area (260-280) and a second contact area (300-315), the resistor having an electrical resistance between the first contact area and the second contact area, the electrical resistance having a first value when the phase change material is in the first phase (amorphous) and a second value when the phase change material is in the second phase (crystalline); a first conductor (270) electrically connected to the first contact area; a second conductor (315) electrically connected to the second contact area, the first conductor, the second conductor, and the resistor being able to conduct a current for heating of the phase change material to enable a transition from the first phase to the second phase (abstract); and a layer of a dielectric material (210) for reducing a heat flow to parts of the body free of the resistor during the heating.

Chiang fails to specify that the dielectric material comprising a porous material with pores having a size between 0.5 and 50nm. Instead, Chiang discloses that the dielectric material is a low-k dielectric (col 7 ln 25-27). Chiang also does not specify the limitations of claim 2, wherein the pores have a size between 1 and 10nm. Chiang also does not specify that the pores are substantially free of water, nor that they have hydrophobic surfaces.

Yan teaches the beneficial use of porous low-k dielectrics as interlevel dielectrics, which can be applied as a thin film (¶107). The zeolite material disclosed has small pores of 5nm, is hydrophobic (¶41) and free of water (¶02). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the material taught by Yan on the device of Chiang, since the material has small pores, uniform pore distribution, and the mechanical strength to be treated with CMP (¶107).

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6. With regards to claim 8, Yan discloses the device of claim 1, wherein the low-k dielectric has porosity above 50% (¶107).

7. Regarding claim 9, Chiang discloses in Fig 14 the device of claim 1, wherein the resistor (290) is embedded in the body, the layer (210) being in direct contact with the resistor.

8. Regarding claim 10, Chiang discloses in Fig 13 the device of claim 9, wherein the first contact area (260-280) is smaller than the second contact area (300-315), and the first conductor comprises a part (270) in direct contact with the first contact area, the part being embedded in the layer (210).

9. Regarding claim 11, Chiang discloses in Fig 1 the device of claim 1, characterized in that the first conductor, the second conductor, the resistor and the layer constitute a memory element (shown in Fig 14), and the body (substrate) comprises: an array of memory cells (5), each memory cell comprising memory element (30) and a respective selection device (col 3 ln 46), and a grid of select lines (10, 20), each memory cell being individually accessible via the respective select lines connected to the respective selection device (col 3 ln 43-48). It is noted that the last line of page 3 of the claims filed 29 March 2005 have not deleted the drawing reference numbers.

10. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang and Yan as applied to claim 4 above, and further in view of Hawker (US 6,670,285). Chiang and Yan disclose the device of claim 4, but fail to specify wherein

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the porous material comprises an organosilicate and the hydrophobic surfaces have hydrocarbyl groups.

Hawker teaches a composition of porous dielectric material comprising a mixture of an organosilicate (col 4 ln 2-3) and hydrocarbyl group (col 9 ln 25-31), beneficial in that this composition has an exceptionally low dielectric constant (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Hawker on the device of Chiang and Yan in order to further lower the dielectric constant.

11. With regards to claims **6 and 7**, Chiang, Yan and Hawker disclose the device of claim 5. The claim limitation, "wherein the porous material is obtainable by applying a liquid layer of a composition comprising tetra-alkoxysilane, hydrocarbyloxysilane, a surfactant and a solvent onto a substrate, wherein the molar ration between tetra-alkoxysilane and hydrocarbyloxysilane is 3:1 at the most, and heating the liquid to remove the surfactant and the solvent and to form the hydrophobic porous layer", describes a product-by process. The claim language "characterized in that the surfactant is a cationic surfactant, and the surfactant and the totality of alkoxysilanes are present in a molar ration greater than 0.1:1" also describes a product-by process. See MPEP 2113. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art,

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the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

The device disclosed by Chiang, Yan, and Hawker meets the structural limitations of the claim language in that it comprises a porous material (organosilicate and hydrocarbyl) obtainable by the process limitations of claims 6 and 7.

12. Claim **12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang and Yan as applied to claim 11 above, and further in view of Ovshinsky (US 6,141,241). Chiang and Yan disclose a grid of select lines, but fail to specify that the selection device of claim 11 comprises a MOSFET having a source region, drain region and a gate region, and the grid of select lines comprises N first select lines, M second select lines, and an output line, the first conductor of each memory element being electrically connected to a first region (source or drain) of the corresponding MOSFET, the second conductor of each memory element being electrically connected to the output line, a second region of the corresponding MOSFET (source or drain) region and which is free from the first region, being electrically connected to one of the N first select lines, the gate region being electrically connected to one of the M second select lines.

Ovshinsky teaches in Fig 11 an arrangement of a memory cell, comprising a MOSFET (22) and phase change storage element (24), where the first conductor of the memory element connects to a first region of the MOSFET, and the second conductor of the memory element is electrically connected to the output line (12). The second region of the MOSFET is connected to one of the N select lines (10) and the gate region

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of the MOSFET is connected to one of the M select lines (26). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Ovshinsky on the device of Chiang and Yan, because data impressed onto the gate line of the MOSFET in this configuration can further modify data on the phase change storage element (col 20 ln 4-7).

Response to Arguments

13. Applicant's arguments filed 22 November 2006 have been fully considered but they are not persuasive. Regarding the argument on page 6 that Chiang does not teach a zeolite material and Yan does not teach the use of zeolite material in a thermal resistor device, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Chiang discloses that the dielectric material is a low-k dielectric and Yan teaches the beneficial use of porous low-k dielectrics as interlevel dielectrics, which can be applied as a thin film in a semiconductor device.

14. In response to applicant's argument on page 7 that Hawker does not mention achieving a stable layer not requiring a dehydroxylation aftertreatment, the mere fact that the references relied upon by the Examiner to evince an appreciation of the problem identified and solved by the instant invention is not, standing alone, conclusive evidence of the non-obviousness of the claimed subject matter. The references may suggest doing what an applicant has done even though those of ordinary skill in the art

were ignorant of the existence of the problem. *In re Gershon*, 152 USPQ 602 (CCPA 1967).

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Ingham whose telephone number is (571) 272-8793. The examiner can normally be reached on M-F, 8am-5pm.

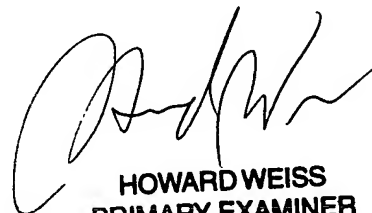
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

John C Ingham
Examiner
Art Unit 2814

jci



HOWARD WEISS
PRIMARY EXAMINER